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(71)Applicant : TDK CORP
 IMAZUMI TEKKOSHO:KK

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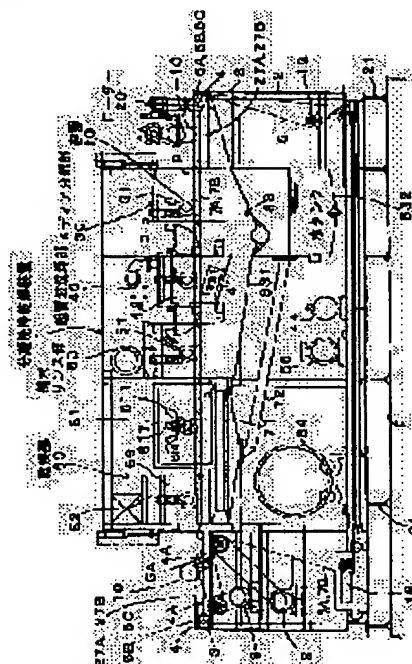
(72)Inventor : MORI KANEO
 ONODERA AKIRA
 SAKURAI TAKASHI
 HIRAKAWA YOSHIHIRO

(54) CHIP TYPE ELECTRONIC COMPONENT SEPARATING, WASHING AND DRYING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To continuously and efficiently perform the operation of transferring a chip component and a medium from a barrel to a different container, then separating the chip component and the medium while continuously and linearly carrying the container and washing and drying the chip component.

SOLUTION: This device is provided with the container 10 provided with a mesh pot for housing the chip type electronic component and the medium, carrying chains 7A and 7B for carrying the container in a fixed direction and a medium separation part 30 for separating the medium inside the container, an ultrasonic washing part 40 for ultrasonically washing the chip type electronic component inside the container, a pure water rinsing part 50 for rinsing the chip type electronic component inside the container with pure water, and a drying part 60 for drying the chip type electronic component inside the container successively in the direction of carrying the container on the carrying chains 7A and 7B.



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CLAIMS

[Claim(s)]

[Claim 1] The chip mold electronic-parts separation washing dryer characterized by to have the container which has the mesh pot which holds chip mold electronic parts and media, the conveyance device convey said container in the fixed direction, the media separation section which separate the media in said container in the direction in which said container is conveyed in said conveyance device, the ultrasonic-cleaning section which clean ultrasonically the chip mold electronic parts in said container, and the dryer part which dry the chip mold electronic parts in said container one by one.

[Claim 2] The chip mold electronic-parts separation washing dryer according to claim 1 which prepared the pure-water rinse section which washes the chip mold electronic parts in said container with pure water between said ultrasonic-cleaning sections and said dryer parts.

[Claim 3] Although the media of a dimension pass [length / of chip mold electronic parts / maximum] said mesh pot in the maximum length smaller than a dimension, said chip mold electronic parts have the mesh which is not passed. Said media separation section is equipped with a jet means to spout a penetrant remover towards said container which has said mesh pot which holds said chip mold electronic parts and said media. The chip mold electronic-parts separation washing dryer according to claim 1 or 2 considered as the configuration in which said media are passed from said mesh pot by said penetrant remover, it discharges, and said chip mold electronic parts remain in said mesh pot.

[Claim 4] The chip mold electronic-parts washing dryer according to claim 3 which spouts a penetrant remover towards said container while rotating said container which has the mesh pot which is equipped with the rotation driving means which rotates said container in said media separation section, and holds said chip mold electronic parts and said media.

[Claim 5] Said ultrasonic-cleaning section is a chip mold electronic-parts separation washing dryer [equipped with the cleaning tank in which the ultrasonic vibrator was prepared, the inlet port established in the both-sides side of the direction where said container of said cleaning tank is conveyed, two openings which make an outlet, the shutter which open and close said opening, and a penetrant remover supply means to supply a penetrant remover to said cleaning tank] according to claim 1, 2, 3, or 4.

[Claim 6] Said dryer part is a chip mold electronic-parts separation washing dryer according to claim 1, 2, 3, 4, or 5 equipped with the Ayr blow nozzle which carries out the Ayr blow towards said container at least.

[Claim 7] It sets in said conveyance device and is a chip mold electronic-parts separation washing dryer according to claim 1, 2, 3, 4, 5, or 6 with said linear fixed direction.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention separates the media used by barrel electrolytic plating after the plating process of the chip which is applied to the equipment used for the process which plates to chip mold electronic parts (it is called a chip below) in order to perform formation of an external electrode etc., especially forms a terminal electrode by barrel electrolytic plating, and relates to the separation washing dryer from which the electrolytic-plating liquid adhering to the chip with which it was plated etc. is removed.

[0002]

[Description of the Prior Art] The ultrasonic cleaner which washes a ferrite magnet etc. continuously is known conventionally, and carrying out maintenance conveyance by using a presser-foot network or a bottom network conveyor for the bottom network conveyor which laid that devise to a cleaning tank as a continuation ultrasonic cleaner, and a network conveyor enables it to arrange linearly and a washed object is indicated by JP,4-176379,A, JP,5-220459,A, and JP,5-293451,A. Moreover, as the barrel-type washing approach and a washing station, insert in work, media, a cleaning agent, etc. which should be washed into a barrel tub, give movement to a barrel tub and work, JP,6-79243,A is made to generate relative motion between work and media, and the washing approach that an operation of a cleaning agent and relative motion remove the detailed pollutant on the front face of work is indicated. Furthermore, sequential conveyance of the barrel is carried out in a series of processes, such as washing, a rinse, and desiccation, and washing with a cleaning tank or the cleaning tank by the supersonic wave is indicated by JP,6-91516,A, JP,6-226216,A, JP,7-31941,A, JP,7-265820,A, and JP,7-275809,A. However, it does not become the optimal washing station for the chip which forms a terminal electrode by barrel electrolytic plating. That is, it is not suitable for conveying the chip and media which were held in a barrel, and with the barrel-type washing approach and a washing station, in order to connect water-works equipment with a barrel tub, it is not suitable for the barrel electrolytic plating using two or more barrels with the washing station by the network conveyor. Moreover, also in the indication [which] which carries out sequential conveyance of the barrel, it is the configuration taken up and down to a cleaning tank, the actuation which goes up and down up and down with the actuation conveyed horizontally will be intermingled, and a barrel will complicate the configuration of a washing station, and futility will produce it in the actuation accompanying conveyance.

[0003]

[Problem(s) to be Solved by the Invention] In the process which is made in order that this invention may solve the trouble in the above Prior arts, holds especially a chip and media in a barrel, and carries out barrel electrolytic plating continuously using two or more barrels Conveying the container continuously and linearly, after moving a chip and media to a container which is different from a barrel A chip and media are separated, and while it is suitable equipment to realize continuously and the configuration of the equipment simplifies washing a chip and drying, it aims at offering the chip mold electronic-parts separation washing dryer which the futility accompanying conveyance does not produce.

[0004] Other purposes and new descriptions of this invention are clarified in the gestalt of the below-mentioned operation.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the chip mold electronic-parts separation washing dryer concerning invention of this application claim 1 The container which has the mesh pot which holds a chip and media, The conveyance device in which said container is conveyed in the fixed direction, and the media separation section which separates the media in said container in the direction in which said container is conveyed in said conveyance device. It is characterized by having the ultrasonic-cleaning section which cleans the chip in said container ultrasonically, and the dryer part which dries the chip in said container one by one.

[0006] Invention of this application claim 2 is characterized by preparing the pure-water rinse section which washes the chip in said container with pure water between said ultrasonic-cleaning sections and said dryer parts in claim 1.

[0007] Invention of this application claim 3 is set to claim 1 or 2. Said mesh pot Although the media of a dimension pass [length / of a chip / maximum] in the maximum length smaller than a dimension, said chip has the mesh which is not passed. Said media separation section It has a jet means to spout a penetrant remover towards said container which has said mesh pot which holds said chip and said media. Said media are passed from said mesh pot by said penetrant remover, and it discharges, and is characterized by considering as the configuration in which said chip remains in said mesh pot.

[0008] In claim 3, invention of this application claim 4 is equipped with the rotation driving means which rotates said container in said media separation section, and it is characterized by spouting a penetrant remover towards said container, rotating said container which has the mesh pot which holds said chip and said media.

[0009] Invention of this application claim 5 is characterized by equipping said ultrasonic-cleaning section with the cleaning tank in which the ultrasonic vibrator was prepared, the inlet port established in the both-sides side of the direction where said container of said cleaning tank is conveyed, two openings which make an outlet, the shutter which open and close said opening, and a penetrant remover supply means to supply a penetrant remover to said cleaning tank in claims 1, 2, and 3 or 4.

[0010] Invention of this application claim 6 is characterized by equipping said dryer part with the Ayr blow nozzle which carries out the Ayr blow towards said container at least in claims 1, 2, 3, and 4 or 5.

[0011] Invention of this application claim 7 is characterized by said fixed direction in said conveyance device being linear in claims 1, 2,

3, 4, and 5 or 6.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of operation of the chip mold electronic-parts separation washing dryer concerning this invention is explained according to a drawing.

[0013] Drawing 1 is the forward sectional view showing the whole principal part configuration of the gestalt of operation of a chip mold electronic-parts separation washing dryer, the whole block diagram which appears as for the door opened and closed although drawing 2 is similarly a front view is shown, and drawing 3 is the top view seen from the upper part which intersects perpendicularly with a front view. Moreover, the front view in the condition that, as for the outline perspective view in which drawing 4 shows a container (pot), and drawing 5, a container appears in the sectional side elevation of a container, and drawing 6 appears in the conveyance chain is shown.

[0014] In barrel electrolytic plating processing, although a chip and media (metal solid sphere used for electrolytic plating) are held together in a barrel, a chip 100 and media 101 are changed to the container 10 shown in drawing 4 and drawing 5 from a barrel before separation washing desiccation processing.

[0015] The separation washing dryer 1 is equipped with the media separation section 30, the ultrasonic-cleaning section 40, the pure-water rinse section 50, and a dryer part 60. A chip 100 and the container 10 of dedication into which media 101 were put Reception, It dissociates, while the media separation section 30 washes a chip 100 and media 101 first. Clean a chip 100 ultrasonically in the ultrasonic-cleaning section 40, and pure water washes a chip 100 in the pure-water rinse section 50. It is the configuration of performing automatically the period until it delivers this container 10 by the one pass to the following process which dries a chip 100 by the dryer part 60, and picks out a chip 100 from the container 10 of dedication.

[0016] For example, about the relation between a product and media size carried out to a dimension calling a product 1608 0.8mm in die length of 1.6mm, width of face of 0.8mm, and thickness, to a product 1608, a configuration will choose the outer diameter of 0.57mm in a globular form, and media 101 will call a chip 100 media size phi 0.57. A container 10 has the cylinder-like mesh pot 11, and constitutes this mesh pot 11 from a mesh which media size phi 0.57 passes and a product 1608 does not pass. When the dimensions of a chip 100 differ, the configuration and size of media 101 will be changed and the mesh of the mesh pot 11 of a container 10 will be changed.

[0017] In order to separate a chip 100 and media 101 and to attain a series of automation to desiccation after that, conveying a container 10, it is important to separation of media 101, washing of a chip 100, and desiccation to share a container 10, and the container 10 possesses the mesh pot of the dedication which can be used through the above-mentioned process.

[0018] Although said container 10 shows structure in more detail to drawing 5, as typically shown in drawing 4, it has the mesh pot 11. This mesh pot 11 makes the network of a stainless steel line the shape of a cylinder, and equips with the disc-like lids 12A and 12B which take up the both ends of a cylinder network. Like drawing 5, it fixed at the end of a cylinder network and the shaft 13 parallel to a cylinder network fixed in the outside of lid 12A at the core of the lid 12A concerned, lid 12A made lid 12A and a field parallel at the edge of a shaft 13, and the sprocket 14 has fixed it. The core of the mesh pot 11 and the center of rotation of a sprocket 14 are these alignments.

[0019] Said lid 12B can be freely detached and attached by one-touch on another side of said cylinder network. As shown in drawing 6, two or more radial pins 15 are formed in lid 12B, it projects into the inner circumference slot 17 of the annular member 16 which fixed at the cylinder network edge, and the radial pin 15 of a condition is engaged. The radial pin 15 is energized with the spring 18 in the drawing-in direction. The lock discharge member 19 of one-touch is formed in the center section of lid 12B, and taper side 19a of the lock discharge member 19 contacts the end face of the radial pin 15. The lock discharge member 19 is energized in the protrusion direction in coiled spring 19b by the side of a base.

[0020] Therefore, in the condition that external force does not join the lock discharge member 19, it is in the condition of the illustration to drawing 5, and by taper side 19a of the lock discharge member 19, the radial pin 15 resists the elastic force of a spring 18, drives in the protrusion direction, and is engaging with the inner circumference slot 17 of the annular member 16. If the lock discharge member 19 is pushed, the location of taper side 19a separates from the radial pin 15, the radial pin 15 can be driven in the drawing-in direction, engagement to the radial pin 15 and the annular member 16 can separate from it, and lid 12B can be made to secede from it with a spring 18. Conversely, what is necessary is just to fit into the annular member 16 of a cylinder network edge, where the lock discharge member 19 is pushed when equipping with lid 12B. In addition, lid 12A and the annular member 16 are connected by the pin 22 for reinforcement.

[0021] Thus, if a chip 100 and media 101 are moved from a barrel as it is, one-touch lid 12B is shut to the constituted container 10 and a container 10 is put on the conveyance chains 7A and 7B from the inlet port (injection station) of a separation washing dryer, a series of processes can be completed. Capacity sets size of a container 10 to 1570 cc by outer-diameter [of 100mm] x die length of 200mm of a cylinder network, and since it holds 800 cc in a chip 100 and the sum total of media 101, it becomes the inner capacity of abbreviation one half.

[0022] As shown in drawing 1 thru/or drawing 3, the separation washing dryer 1 attaches and constitutes each device in a stand 2, and lays a stand 2 in Floor F with two or more foot 21. As for the shaft 4 which the bearing 3 fixed to a stand 2 supports to revolve, and the sprocket attached in a shaft 4, it has two or more sets. Among sprocket 5A of the plurality of drawing 3, the chain 6 for rotation for carrying out the rotation drive of the container 10 is laid. Moreover, between sprocket 5B prepared in the both sides of a shaft 4, and 5C, the chains 7A and 7B for conveyance of the pair which conveys a container 10 are laid. That is, as for the chain for conveyance, it has Chains 7A and 7B and plurality from this side of drawing 1. This condition is shown in detail by drawing 5 seen and shown from the direction which intersects perpendicularly to drawing 1, and the conveyance chains 7A and 7B are located in the both sides of the mesh pot 11 of a container 10. The conveyance chains 7A and 7B are unified by the stay pin 25 which extends the link shaft of the location which counters, and the conveyance chains 7A and 7B equip a gestalt like a ladder with two or more stay pins 25. Then, conveyance chain 7A is two or more sprocket 5B, and conveyance chain 7B is two or more sprocket 5C, and is laid respectively. The chain 6 for rotation engages with the sprocket 14 with which a container 10 is equipped as shown in drawing 5. The stay pin 25 which connects the conveyance chains 7A and 7B is a configuration supported for one container 10 by total of 2 of roller 26A which supports Rollers 26A and 26B to both ends, enabling free rotation, and adjoins each other, and four 2 of adjacent roller 26B, enabling free rotation. The device containing these conveyance chains 7A and 7B etc. is making the conveyance device.

[0023] Moreover, when said container 10 side sprocket 14 is rotated with the chain 6 for rotation it runs, turning effort is transmitted from a shaft 13 to the mesh pot 11 through lid 12A, and after all, a container 10 will be supported by one free [rotation on Rollers 26A

and 26B], and will rotate. The device containing these chains 6 for rotation is making the rotation driving means which rotates a container 10.

[0024] The loader 20 for carrying out automatic installation of the container 10 on conveyance chain 7A and 7B is installed in the right end of drawing 1 and drawing 2.

[0025] Moreover, motors 8 and 9 are being fixed to stand 2 left end in drawing 1 and drawing 2. If a chain is laid between the sprocket which fixed to the output shaft of a motor 8, and the sprocket which fixed on the shaft 4 and the output shaft of a motor 8 rotates, it will consider as the structure through which the conveyance chains 7A and 7B circulate. If a chain is laid between the sprocket which fixed to the output shaft of a motor 9, and the sprocket which fixed to shaft 4A and the output shaft of a motor 9 rotates, it will consider as the structure through which the rotation chain 6 circulates.

[0026] Two or more chain guides are fixed above a stand 2. It has a chain guide in the direction which intersects perpendicularly from this side of drawing 1 with chain guides 27A and 27B, as for chain-guide 27A, plurality is arranged in this side of drawing 1 at a horizontal single tier, and, as for chain-guide 27B, plurality is arranged at a horizontal single tier at the back side of drawing 1. Chain-guide 27A supports conveyance chain 7A, and chain-guide 27B supports conveyance chain 7B. In addition, tensioner 18 is a configuration which carries out parallel translation of the integral-construction object of the bearing of this part, a shaft, and a sprocket, and can adjust the flare of the conveyance chains 7A and 7B. Moreover, tensioner 19 is fixable after making it move to right and left so that the flare of the rotation chain 6 can be adjusted.

[0027] Although the separation washing dryer 1 is the configuration of conveying a container 10 in the direction of an arrow head P as shown in drawing 1, the configuration for processes performed to the container 10 conveyed is explained in order. In addition, with the gestalt of this operation, conveyance of a container 10 shall be intermittent conveyance.

[0028] As shown in drawing 7 and drawing 8, the media separation section 30 which carries out separation discharge of the media 101 sees from the container conveyance direction, and is arranged in the forefront location. This media separation section 30 is equipped with the shower section 31. The shower section 31 is equipped with the shower nozzle 311, and the shower nozzle 311 is equipped with the exhaust nozzle 312, and it constitutes a jet means to spout the wash water as a penetrant remover. An exhaust nozzle 312 is long and slender opening in the rectangle extended in the direction of a cylinder of a container 10, for example, spouts wash water in the shape of knife edge covering the direction overall length of a cylinder of the downward container 10. Under the container 10 by which intermittent conveyance is carried out in the arrow-head P1 direction like drawing 8, the exhaust passage 33 of media 101 or wash water is arranged. Exhaust passage 33 becomes by funnel-like chute 331 and an exhaust port 332, and is discharged in the wash water separation section 34 from an exhaust port 332 in response to media 101 or wash water with chute 331. It does not need to be located in right under [the configuration, then right under] which arrange the wash water separation section 34 just under an exhaust port 332, or connect a duct and a pipe to an exhaust port 332 although it is shown that media 101 and wash water move drawing 8 by the arrow head Q. Anyway, all of the media 101 discharged from the exhaust port 332 or wash water are the configurations of resulting in the wash water separation section 34.

[0029] The rotational frequency of the container 10 which has the mesh pot 11 is set to 25 - 30rpm as conditions in the shower section 31, the slit dimension of an exhaust nozzle 312 is made into width-of-face [of 0.8-1.0mm] x die length of 250mm, and if the amount of wash water to spout is considered as the above by 50l./and time amount which separation takes is made into 180 seconds, it can separate media 101 from a container 10 nearly completely. The media 101 separated by the shower section 31 are the configurations from which will be discharged, catch with chute 331 like drawing 8, discharge from an exhaust port 332 to wash water and coincidence, lead in the mesh cage 341 of the wash water separation section 34, leave media 101, are made to pass wash water, and it drains off water 2.5kg (it is made capacity and is 500 cc or more) per about 4 minutes every. The mesh cage 341 forms the spiral fillet 342 in the inner circumference of a cylinder network, and the rotation drive of the cylinder network is carried out by making the cylinder core into the center of rotation. The media 101 introduced with wash water in the rotating mesh cage 341 have passage prevented by the mesh cage 341, are transported in the direction of a cage right end by work of the spiral fillet 342 of the mesh cage 341 inside, and fall one after another in the media recovery box 343 put side by side beside the water tank 532. Wash water passes the mesh cage 341 and returns to the downward water tank 532. As shown in drawing 8, the water in a water tank 532 is pumped up with a pump 44, and the shower nozzle 311 is supplied. That is, water is supplied to the shower nozzle 311 through the pipe 45 which the pipe 43 connected under the water tank 532, and the pump 44 connected to the other end of a pipe 43, and was connected to the outlet of a pump 44.

[0030] In addition, although mentioned later, in order that the water in a water tank 532 may also use the ultrasonic-cleaning section 40 and the pure-water rinse section 50, let the water supplied to a water tank 532 be pure water.

[0031] As shown in drawing 8, it sees from the conveyance direction of a container 10, and the ultrasonic-cleaning section 40 and the pure-water rinse section 50 are formed after the media separation section 30. In the ultrasonic-cleaning section 40, it is the configuration of cleaning ultrasonically to the container 10 which has the mesh pot 11 which rotates while intermittent conveyance is carried out in the direction of an arrow head P2, and a cleaning tank 42 is a container which equips the rectangular pipe configuration of four side faces with a bottom 421, and is equipped with opening on top and the downward exhaust port 422. Furthermore, on the conveyance way of a container 10, it has opening 423,424, and has the shutter 411 which opens and closes opening 423, and the shutter 412 which open and close opening 424. A shutter 411,412 is supported pivotably by the upper part of opening 423,424, and is rocked, opened and closed to imaginary line 411' and the location shown in 412'. A shutter 411,412 is a configuration opened and closed by the driving means (for example, ***, oil pressure, or electric **) which is not illustrated. While the conveyance chains 7A and 7B which carry out intermittent transit are opening the shutter 411,412, after sending in one container 10 in a cleaning tank 42, if a shutter 411,412 is shut, the downward exhaust port 422 will only carry out opening of the cleaning tank 42 except opening on top. Although an exhaust port 422 passes a flow rate predetermined by the shape of a slit, the water level in a cleaning tank 42 is maintained by supplying the water of the specified quantity with a pump 44 from a water tank 532. That is, in the circulatory system which a pipe 43 connects under the water tank 532, a pump 44 connects to the other end of a pipe 43, and a pipe 45 connects to the outlet of a pump 44, it is the configuration which maintains water level by supplying the water of a predetermined amount to a cleaning tank 42. It is made to open, after stopping water supply and lowering water level to below the lower side of opening, before opening a shutter 411,412.

[0032] The ultrasonic-cleaning section 40 arranges an ultrasonic vibrator 41 to the conveyance path down side of a container 10 as opposed to a cleaning tank 42. However, the number of an ultrasonic vibrator and arrangement have arbitrary ultrasonic cleaning in the

range performed effectively. An ultrasonic vibrator 41 will vibrate, if it connects with the drive power source which is not illustrated and power is supplied from a drive power source (ultrasonic wave oscillator), and supersonic vibration is given to the water which maintained predetermined water level at the cleaning tank 42, and was held in it. The container 10 of a position is in the location which receives supersonic vibration from an ultrasonic vibrator 41 most efficiently, vibrates the chip 100 in a container 10 effectively, and removes an affix from a chip 100, and carries out more advanced washing by the pure-water permutation. If a container 10 is respectively conveyed in the location of a degree and a container 10 stops in the location of a degree respectively, after stopping a pump 44, lowering the water level of a cleaning tank 42 and opening a shutter 411,412 to the location of an imaginary line before conveying a container 10 in the location of a degree respectively, after closing a shutter 411,412, a pump 44 is operated, the water of a predetermined amount is supplied to a cleaning tank 42, and water level is recovered to a position. For this reason, a pump 44 and an ultrasonic vibrator 41 will carry out intermittent operation. In addition, the water which came out from the exhaust port 422 of said cleaning tank 42 returns to a water tank 532 through the funnel-like chute 331 and the wash water separation section 34.

[0033] If the circulation processor of the pure-water rinse section 50 and pure water is explained, the pure-water rinse section 50 will be equipped with a different spray nozzle 51 from said shower nozzle. When a spray nozzle 51 is equipped with the pipe 511 parallel to the cylinder of a container 10, and two or more injection tips 512 arranged by the longitudinal direction of a pipe 511 along the direction of a container cylinder and the pressurized pure water is supplied to a pipe 511, it is the configuration injected in a container 10 from an injection tip 512, and the rinse shower of the container 10 is carried out by injection with pure water, and the pure-water permutation of the front face of a chip 100 is carried out. The water after injection returns to a water tank 532 through the funnel-like chute 331 and the wash water separation section 34. After a container 10 is conveyed in the direction of an arrow head P3 by intermittent transit of the conveyance chains 7A and 7B, is carried in to the pure-water rinse section 50 from the ultrasonic-cleaning section 40 and receives a rinse shower, it is sent out to the location of a degree.

[0034] Although pure water is supplied to said water tank 532, since the cyclic use of waste water is carried out in the media separation section 30, the ultrasonic-cleaning section 40, and the pure-water rinse section 50, the collected water may be dirty a little. Although it pumps [directly] up the water in a water tank 532 with a pump 44 and is usable in the media separation section 30 and the ultrasonic-cleaning section 40 (it will let the filter from which a pollutant is removed pass if required), the water of a water tank 532 cannot be directly used on the need of covering the rinse shower of pure water, in the pure-water rinse section 50. For this reason, a pipe 54 connects with the method of the lowest of a water tank 532, and a pump 55 connects with the other end of a pipe 54. A pipe 561 connects with the delivery of a pump 55, and the UV disinfection section 57 connects with the other end of a pipe 561. The 10-micrometer filter 581 connects with the outlet of the UV disinfection section 57 through a pipe 562. The ion-exchange machine 59 connects with the outlet of a filter 581 through a pipe 563. The 1-micrometer filter 582 connects with the outlet of the ion-exchange machine 59 through a pipe 564, a pipe 565 connects with the outlet of a filter 582, and the other end of a pipe 565 is considered as the configuration linked to the pipe 511 of a spray nozzle 51. A pipe 511 will be injected in a container 10 from an injection tip 512, if it is only that two or more injection tips 512 carry out opening outside and the pure water pressurized with the pump 55 circulates to a pipe 511 except for connection of a pipe 565. Water is irradiated with a UV disinfection LGT, bacteria etc. are annihilated, the UV disinfection section 57 in the middle of the water from a tank 532 circulating with a pump 55 removes particles, such as raising dust of killed bacteria, such as dust which water removed and contained at the washing process, and bacteria, and a pump, and a filter 581,582 removes the ion contained in used water, and it supplies the ion-exchange machine 59 to the pure-water rinse section 50 as pure water. In addition, the specified quantity of new pure water 533 is supplied to a water tank 532, and the amount of the pure water held by the circulatory system and the circulation processor of pure water is always maintained at the specified quantity.

[0035] As shown in drawing 9, the dryer part 60 is equipped with the air blow sections 61 and 62 along with the conveyance chains 7A and 7B which convey a container 10 in the direction of an arrow head P4. The high efficiency particulate air filter 66 which is an air filter effective in removal of a particle etc. connects with the other end of the blower 64 which equips the atmospheric taking-in opening 641 with a suction filter 63, the pipe 65 linked to the Ayr outlet of a blower 64, and a pipe 65, and a pipe 67 connects the configuration of the Ayr supply in the Ayr blow section 61 to the outlet of a high efficiency particulate air filter 66. A pipe 67 branches to Pipes 68A, 68B, and 68C by the air pro 61 part. The Ayr blow section 61 is equipped with the Ayr blow nozzle 611,614 and the spot nozzle 617, the Ayr blow nozzle 611 linked to pipe 68A is equipped with the exhalation opening 612, and the Ayr blow nozzle 614 linked to pipe 68B is equipped with the exhalation opening 615. The exhalation opening 612,615 is a nozzle slit long in the direction of a cylinder of a container 10, for example, is a configuration which die length can set to 350mm by width of face of 0.5mm as a dimension of a nozzle slit, and spouts the Ayr blow 613,616 toward the downward container 10 from the upper part. Moreover, the spot nozzle 617 linked to pipe 68C is a configuration which it has the exhalation opening 618, and plurality is arranged in the direction of a cylinder of a container 10, and spouts the Ayr blow 619 toward the downward container 10 from the upper part.

[0036] The Ayr blow section 62 makes whole ** 69 by which it is arranged in the latter part of the Ayr blow section 61, and the container 10 has been arranged pass through Ayr which passed said high efficiency particulate air filter 66, and is drying the chip 100 in a container 10.

[0037] Said Ayr blow sections 61 and 62 equip the conveyance path lower part of a container 10 with Ayr and the exhaust passage 70 of waterdrop. Exhaust passage 70 is making the shape of a funnel Ayr blow section 61 lower part, and it has an exhaust port 701 in a lower limit, and receives in a location in the middle of exhaust passage 70, and a network 71 is arranged. The exhaust port 701 is connected to said water tank 532 through the discharge pipe 72. The waterdrop which descended exhaust passage 70 passes the receptacle network 71, results in an exhaust port 701, and returns to a water tank 532 through the discharge pipe 72. If media 101 may remain slightly and the Ayr blow is carried out from the upper part at a container 10 even if a container 10 results in a dryer part 60, the media 101 which remain with waterdrop will also fall. Catching these falling media 101 will win popularity, and it is a network 71, and only waterdrop will descend to the downward exhaust port 701, and will collect media 101. Moreover, when the drying time for 180 seconds was established in the air blow section 61, rotating the container 10 which has the mesh pot 11 by 25 - 30rpm as conditions in desiccation, drying quickly from about 120 seconds and drying perfectly in 180 seconds at first was checked. Desiccation is made much more reliable by furthermore ventilating the container 10 whole in the Ayr blow section 62.

[0038] Drawing 10 is a flow chart which shows the process of a separation washing dryer, and, thereby, gives overall explanation of a separation washing dryer of operation.

[0039] If a container 10 is fed into a separation washing dryer, being laid on the conveyance device in which it has the conveyance chains 7A and 7B with the loader 20 of drawing 1, and intermittent conveyance being carried out first at the media separation section

30, and rotating a container 10 in the shower section 31 here, wash water will be injected and media 101 will be separated from a container 10. Media 101 are collected in the media recovery box 343 through the mesh cage 341 which the wash water separation section 34 of drawing 8 has. Wash water passes the mesh cage 341 and returns to a water tank 532. In addition, supply of the wash water to the shower section 31 is performed by pumping up the water of a water tank 532 with a pump 44.

[0040] A container 10 is introduced in a cleaning tank 42 in the condition that the shutter 411,412 of the ultrasonic-cleaning section 40 of drawing 8 opened from the media separation section 30 according to the conveyance device. If a container 10 enters in a cleaning tank 42, a shutter 411,412 will close, wash water is filled in a cleaning tank 42, a supersonic wave is emitted from an ultrasonic vibrator 41, and ultrasonic cleaning is performed by giving supersonic vibration to the chip 100 in a container 10. In addition, supply of wash water to said cleaning tank 42 is performed by pumping up the water of a water tank 532 with a pump 44.

[0041] The container 10 which ultrasonic cleaning ended lowers the water level in a cleaning tank 42, and where a shutter 411,412 is opened, it is transported to the pure-water rinse section 50 according to a conveyance device. In the pure-water rinse section 50, pure water is injected and washed in a container 10 from the spray nozzle 51 of drawing 8, and the pure-water permutation of the front face of a chip 100 is carried out. Supply of the pure water to a spray nozzle 51 pumps up the water of a water tank 532 with a pump 55, and is performed through the filter 581 of 57 or 10 micrometers of UV disinfection sections, and the filter 582 of 59 or 1 micrometer of ion-exchange machines.

[0042] The container 10 which came out of the pure-water rinse section 50 is transported by intermittent conveyance of a conveyance device in order of the air blow sections 61 and 62 of a dryer part 60, and ventilates through a high efficiency particulate air filter 66 from the blower 64 with a suction filter 63, and a chip 100 is dried for it by the Ayr blow. Then, a container 10 is transported to the discharge side edge of a conveyance device.

[0043] According to the gestalt of this operation, the effectiveness as follows can be acquired.

[0044] (1) The conveyance device in which the container 10 which has the mesh pot 11 which holds a chip 100 and media 101 is conveyed in the fixed direction. In order, in the direction in which a container 10 is conveyed, the media separation section 30 and the ultrasonic-cleaning section 40, It has the pure-water rinse section 50 and a dryer part 60, and it is the configuration that a container 10 is conveyed to an intermittent and fixed horizontal direction (longitudinal direction), it is not necessary to perform too much different actuation from the conveyance direction for which a container is moved, for example in the vertical direction, and the futility accompanying conveyance or migration of a container does not arise.

[0045] (2) About the container 10 which has the mesh pot 11 which holds a chip 100 and media 101 Although the media 101 of a dimension were chosen [length / of a chip 100 / maximum] in the maximum length smaller than a dimension and media 101 passed the mesh pot 11, since the chip 100 was constituted from a mesh which is not passed By blowing off wash water from an exhaust nozzle towards a container 10 in the media separation section 30, passing media 101 from the mesh pot 11 with wash water, discharging, and making a chip 100 remain in the mesh pot 11 The effectiveness that a chip and media are efficiently separable with the easy configuration in comparison is acquired. Media separation can be performed much more certainly and efficiently by rotating a container 10 in that case.

[0046] (3) Since the chip 100 in a container is cleaned ultrasonically in the ultrasonic-cleaning section 40, a pollutant is certainly removable from a chip 100. Moreover, since the cleaning tank 42 of the ultrasonic-cleaning section 40 has a shutter to an inlet port and an outlet, it can carry in and take out a container 10 to a cleaning tank 42 by carrying out horizontal migration.

[0047] (4) Since the rinse shower of pure water is covered over the chip 100 in a container 10 in the pure-water rinse section 50, it can prevent that a pollutant remains on chip 100 front face.

[0048] (5) In the air blow section 61 of a dryer part 60, the waterdrop which adhered to the chip 100 in a container by the high-speed Ayr blow can be blown away, and generating of the dirt and the stain which are easy to generate when it is made to dry after the waterdrop of chip 100 front face has adhered can be avoided.

[0049] In addition, although the shower section in the media separation section 30 considered as one station, it is good also as two or more stations.

[0050] Moreover, although the water of the water tank 532 with which pure water is supplied was used common to the media separation section 30, the ultrasonic-cleaning section 40, and the pure-water rinse section 50, only the pure-water rinse section 50 completely sets aside a hydrologic cycle network, and is used as the demineralised water tank with which only the pure-water rinse section 50 receives supply of pure water, and other parts are good also as a configuration which uses penetrant removers other than industrial water or water.

[0051] Although the gestalt of operation of this invention has been explained above, probably, as for this invention, it will be obvious to this contractor for various kinds of deformation and modification to be possible within the limits of the publication of a claim, without being limited to this.

[0052]

[Effect of the Invention] As explained above, according to the chip separation washing dryer concerning this invention The container which has the mesh pot which holds a chip and media, The conveyance device in which said container is conveyed in the fixed direction, and the media separation section which separates the media in said container in the direction in which said container is conveyed in said conveyance device, Since it considered as the configuration equipped with the ultrasonic-cleaning section which cleans the chip in said container ultrasonically, and the dryer part which dries the chip in said container one by one, separation of media, washing, and desiccation can be automatically performed by conveying said container in the fixed direction (longitudinal direction). Moreover, on the occasion of those separation, washing, and desiccation, it is not necessary to perform too much different actuation from the conveyance direction for which a container is moved, for example in the vertical direction, and the futility accompanying conveyance or migration of a container does not arise.

[0053] moreover, although media pass a mesh pot, using the container which has the mesh pot which holds a chip and media, if a chip is constituted from a mesh which is not passed, it will be spouting a penetrant remover towards a container in the media separation section from an exhaust nozzle, and the effectiveness that it is comparatively alike and a chip and media can be efficiently separated with an easy configuration will be acquired.

[0054] Furthermore, since the chip in a container is cleaned ultrasonically in the ultrasonic-cleaning section, the pollutant of a chip is certainly removable.

[Translation done.]

* NOTICES *

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damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the forward sectional view showing the whole principal part configuration of the gestalt of operation of the chip separation washing dryer concerning this invention.

[Drawing 2] It is this front view.

[Drawing 3] It is this top view.

[Drawing 4] It is the mimetic diagram showing the container which holds a chip and media in the gestalt of operation.

[Drawing 5] It is the sectional side elevation of said container.

[Drawing 6] It is the rear view showing said container laid in the conveyance chain.

[Drawing 7] It is the explanatory view showing the media separation section which separates media from said container.

[Drawing 8] It is the explanatory view showing the media separation section, the ultrasonic-cleaning section, and the pure-water rinse section.

[Drawing 9] It is the explanatory view showing the dryer part which carries out the Ayr blow toward said container.

[Drawing 10] It is the flow chart which shows the process of a separation washing dryer.

[Description of Notations]

1 Separation Washing Dryer

2 Stand

3 Bearing

4 13 Shaft

5A, 5B, 5C, 14 Sprocket

7A, 7B Conveyance chain

8 Nine Motor

10 Container

11 Mesh Pot

12A, 12B Lid

14 Sprocket

15 Radial Pin

16 Annular Member

17 Inner Circumference Slot

19 Lock Discharge Member

20 Loader

25 Stay Pin

26A, 26B Roller

28 29 Tensioner

30 Media Separation Section

31 Shower Section

33 Exhaust Passage

34 Wash Water Separation Section

40 Ultrasonic-Cleaning Section

41 Ultrasonic Vibrator

42 Cleaning Tank

44 55 Pump

50 Pure-Water Rinse Section

57 UV Disinfection Section

59 Ion-Exchange Machine

60 Dryer Part

61 62 Ayr blow section

64 Blower

70 Exhaust Passage

71 Receptacle Network

100 Chip

101 Media

311 Shower Nozzle

312 Exhaust Nozzle

331 Chute

341 Mesh Cage

343 Media Recovery Box
411,412 Closing motion shutter
422 Exhaust Port
512 Injection Tip
532 Water Tank
533 Pure Water
581,582 Filter
611,614 Ayr blow nozzle
612,615,618 Exhalation opening
617 Spot Nozzle

[Translation done.]